JOINT STRIKE FIGHTER
the next generation strike fighter

JOINT STRIKE FIGHTER PROGRAM BRIEFING

to

DAU Symposium on Jointness and Interoperability

8 June 2004

RDML Steven L. Enewold, USN

Deputy Program Executive Officer, Joint Strike Fighter Program

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VISION

BE THE MODEL ACQUISITION PROGRAM FOR JOINT SERVICE AND INTERNATIONAL COOPERATION.

DELIVER TO OUR WAR FIGHTERS AN AFFORDABLE AND EFFECTIVE NEXT GENERATION STRIKE FIGHTER WEAPON SYSTEM AND SUSTAIN IT WORLDWIDE.

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Purpose

- **What we really want you to talk about are:**
  - A brief summary of where the program is right now (unclassified of course); and
  - Significant joint issues (organization, leadership, cultural differences, cost, schedule, performance, risk) in the JSF Program, and the strategies you used to handle them… anything you have to say regarding joint program management and interoperability in relation to the JSF

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What Is JSF?

The next generation "family" of strike fighters

- Stealth signature and advanced countermeasures
- Advanced avionics, data links and adverse weather precision targeting
- Increased range with internal fuel and weapons
- Highly supportable, state of the art prognostics and health management

Lethal Survivable Supportable Affordable

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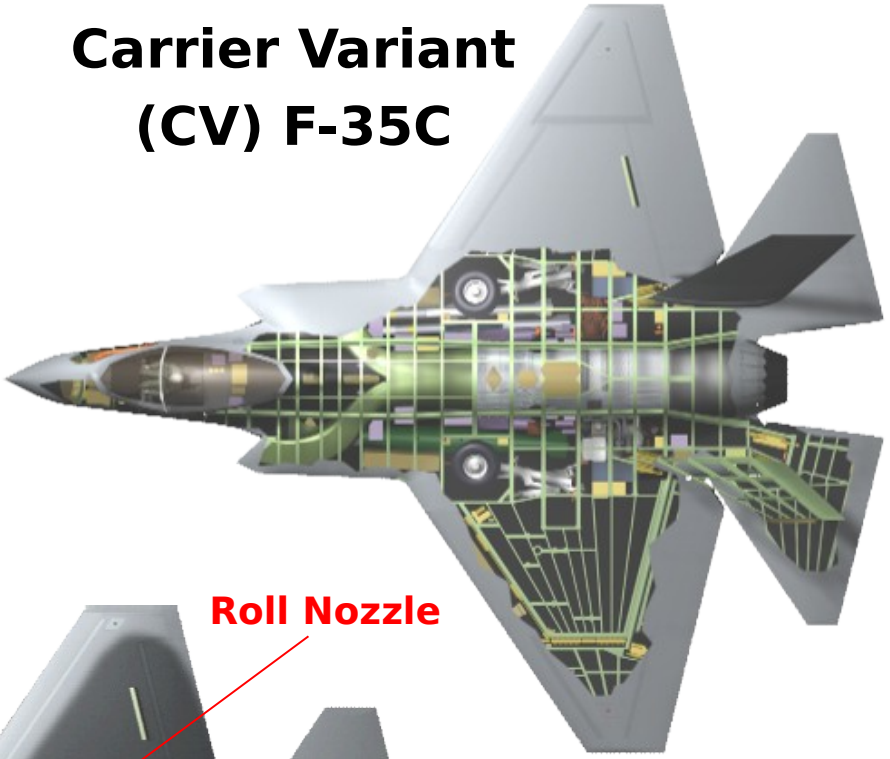
JSF Family Of Aircraft (F-35 A/B/C)

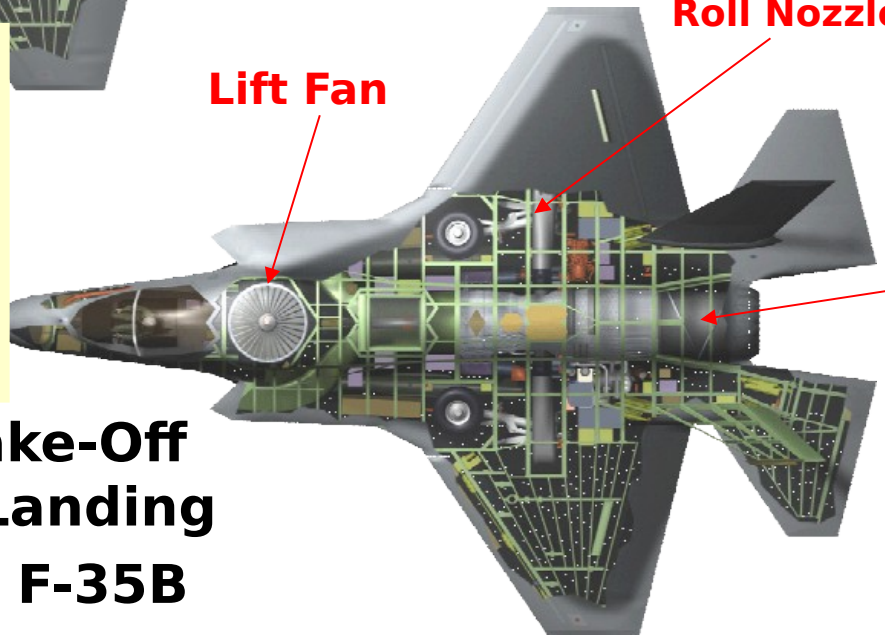
Conventional Take-Off and Landing (CTOL) F-35A

Carrier Variant (CV) F-35C



All variants

- 450-600 nm Range
- 1.6 Max Mach (Limit)
- Stealthy
- Same Weapons
- Same Avionics
- Similar Flight Envelope
- Same Basic Engines



Short Take-Off Vertical Landing (STOVL) F-35B

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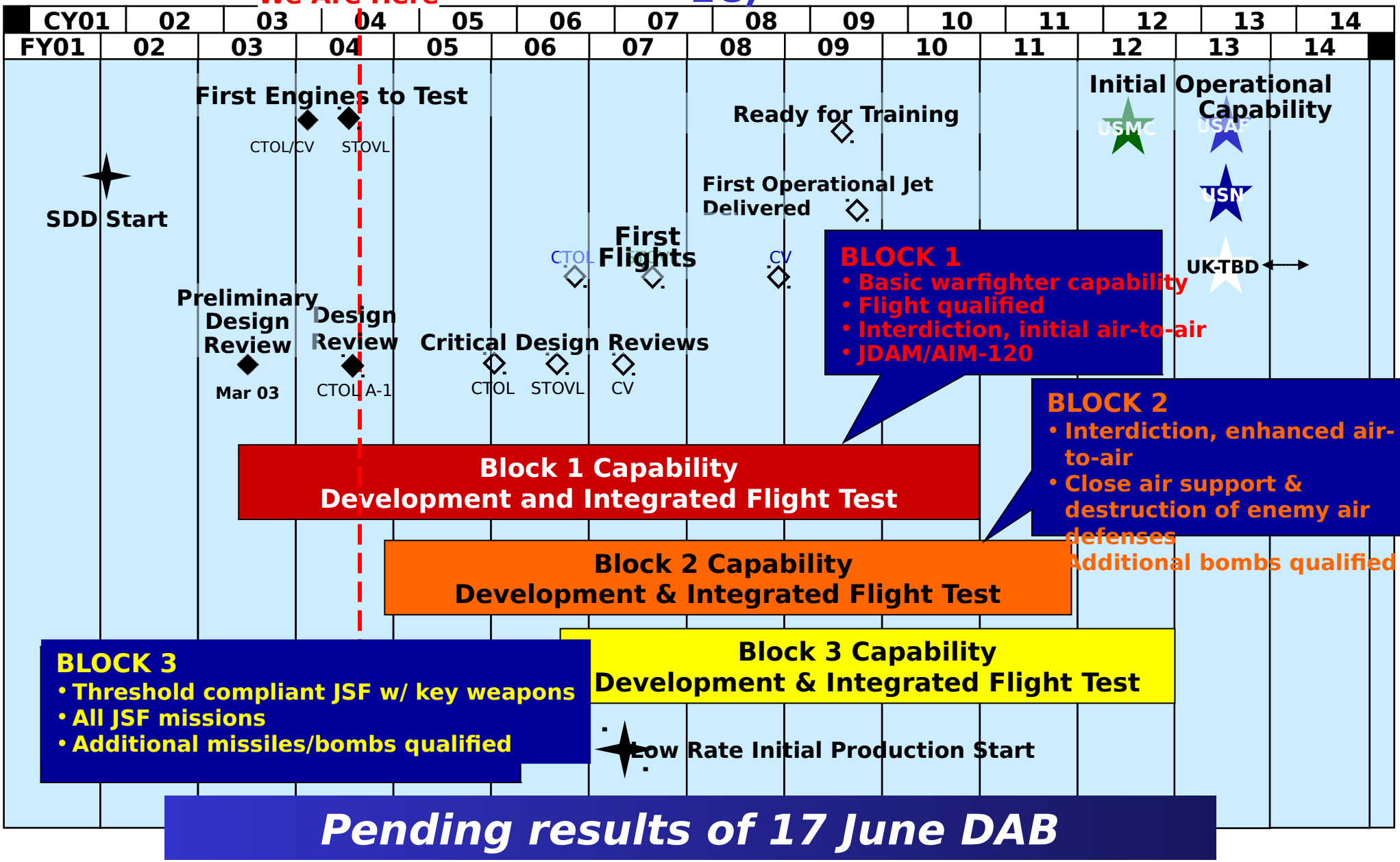
Re-Planned System Development and Demonstration (SDD) Schedule (IAW 2C)



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Key Performance Parameters

USMC ★ USN ★ Joint ★

KPP	USMC	USAF	USN
Radio Frequency Signature	Stealthy		
Combat Radius	450 nm USMC Profile	590 nm USAF Profile	600 nm USN Profile
Sortie Generation	4 Surg / 3 Sust	3 Surg / 2 Sust	3 Surg / 2 Sust
Logistics Footprint	< 8 C-17 equivalent loads (20 PAA)	< 8 C-17 equivalent loads (24 PAA)	< 46,000 cu ft 243 ST
Mission Reliability	95%	93%	95%
Interoperability	Meet 100% of critical, top-level Information Exchange Requirements Secure Voice and Data		
STOVL Mission Performance		N/A	N/A
Short Take-Off Distance	550’		
Vertical Lift Bring Back	2 x 1K JDAM, 2 x AIM-120 With Reserve Fuel		
Maximum Approach Speed	N/A	N/A	145 knots

Projected to meet or exceed KPPs

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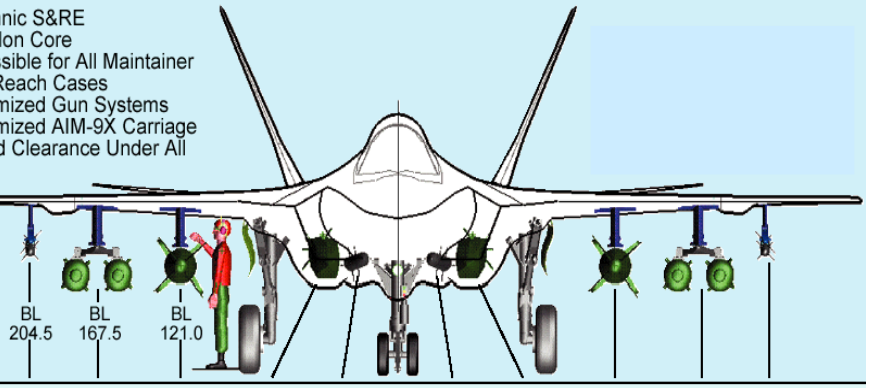
Requirements

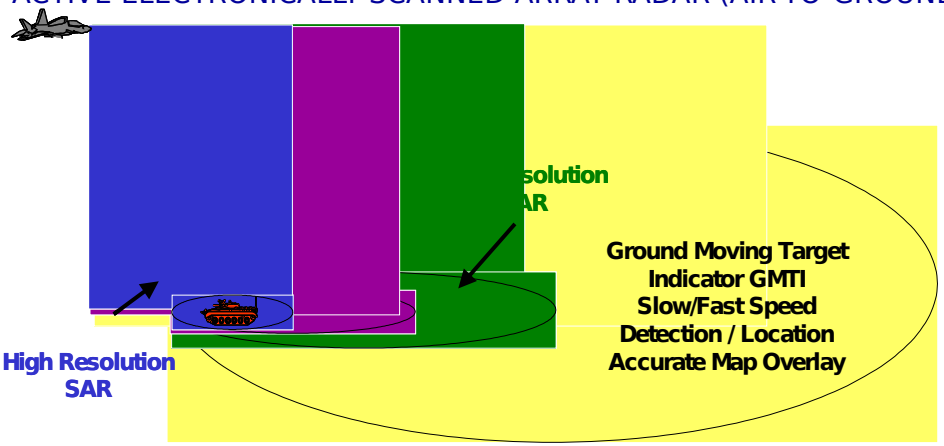
WEAPONS CARRIAGE

- Nonpyrotechnic S&RE
- Common Pylon Core
- Easily Accessible for All Maintainer Height and Reach Cases
- Variant Optimized Gun Systems
- Variant Optimized AIM-9X Carriage
- Deck/Ground Clearance Under All Conditions



Station No.	11	10	9	8	7	6	5	4	3	2	1
Store Type	A/A	A/A, A/S	A/A, A/S	A/A, A/S	A/A	A/S	A/A	A/A, A/S	A/A, A/S	A/A, A/S	A/A
Weight Capacity	300	2,500	5,000	2,500	350	1,000	350	2,500	5,000	2,500	300

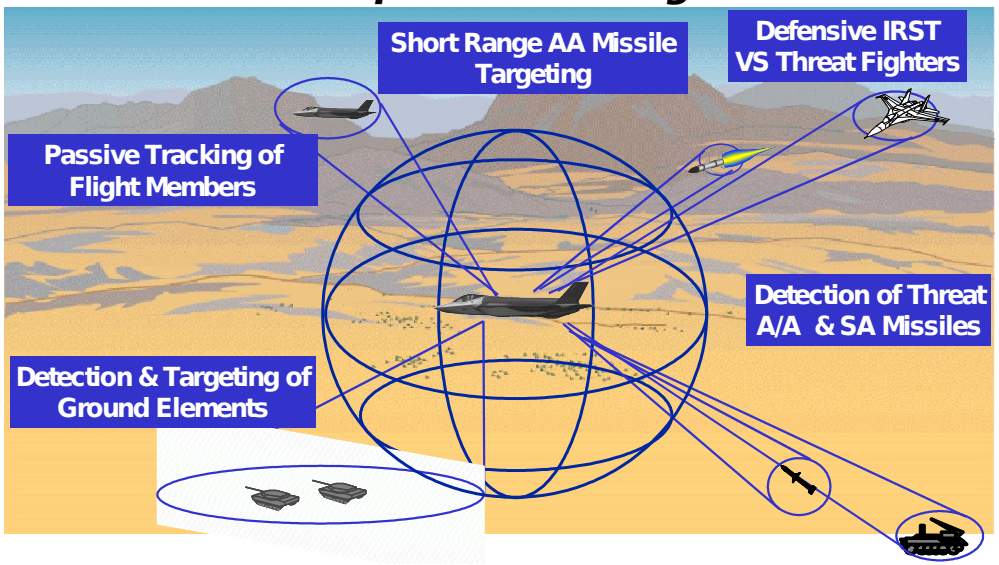
ACTIVE ELECTRONICALLY SCANNED ARRAY RADAR (AIR-TO-GROUND)



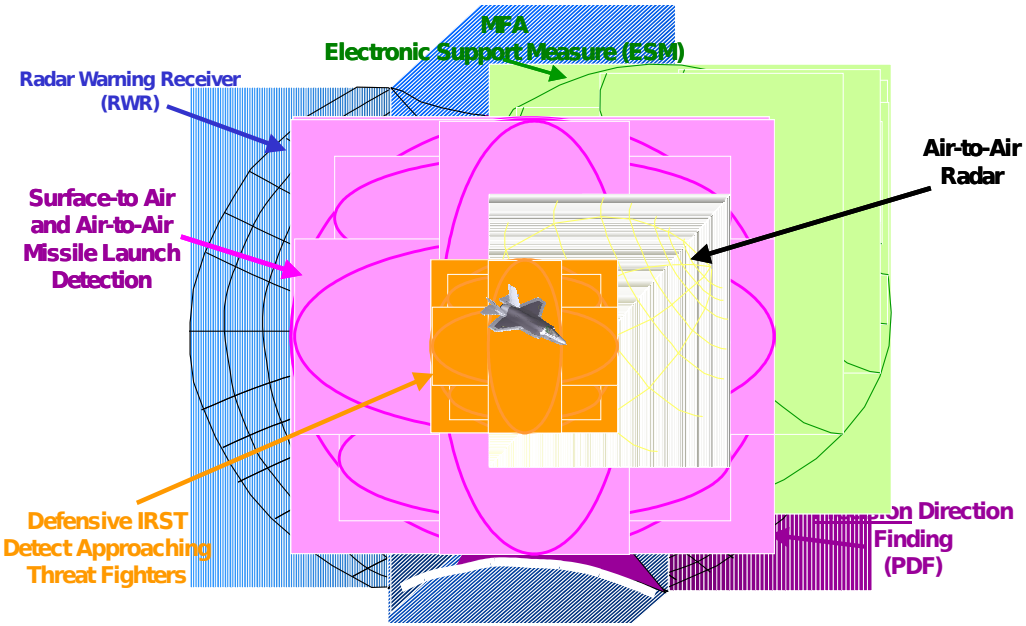
Provides Day & Night Adverse WX, Multi-Mission, Long Range Target Detection and Classification Capability, and Near Precision Self-Targeting Capability With Standard J DAM

DISTRIBUTED APERTURE SYSTEM (DAS)

Full Spherical Coverage


Short Range AA Missile Targeting
Defensive IRST VS Threat Fighters
Passive Tracking of Flight Members
Detection of Threat A/A & SA Missiles
Detection & Targeting of Ground Elements

INTEGRATED SENSOR SUITE


MFA
Electronic Support Measure (ESM)
Radar Warning Receiver (RWR)
Air-to-Air Radar
Surface-to Air and Air-to-Air Missile Launch Detection
Defensive IRST Detect Approaching Threat Fighters
on Direction Finding (PDF)

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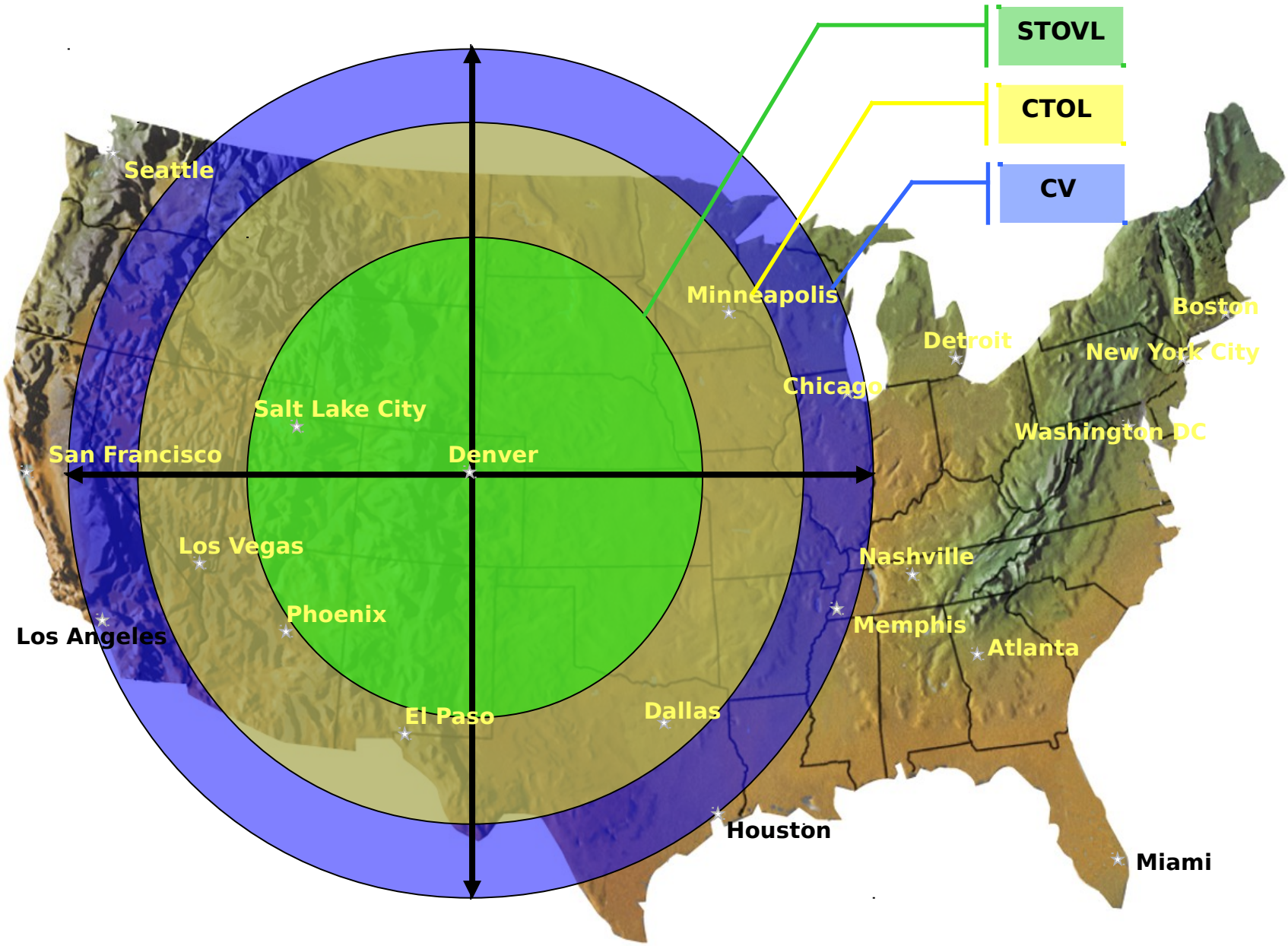
Combat Radius



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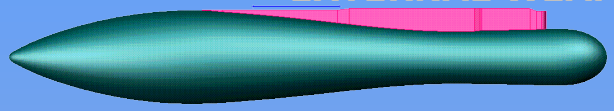
Weapons Carriage Requirements

Store Fully Certified During S

EXTERNAL WEAPONS


426 -Gallon Wing Tank

Stormshadow

AGM-158 JASSM

MXU-648/CNU-88 Baggage Pod

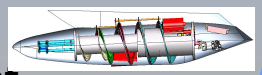
AIM-120C AMRAAM

AIM-120B AMRAAM

AIM-9X Sidewinder

BDU-57/58/60
aser-Guided Training Round

Brimstone/Joint
Common Missile


Missionized Gun

INTERNAL AND EXTERNAL WEAPONS

GBU-32 JDAM 1,000-lb
(MK-83/BLU-110 Warhead)

GBU-12 Paveway II 500-lb LGB
(MK-82 Warhead)

GBU-31 JDAM 2,000-lb
(MK-84 Warhead)

AGM-154A/C JSOW Glide Bomb

CBU-103/104/105 WCMD

GBU-38 JDAM 500-lb
(MK-82 Warhead)

Brimstone

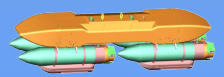
GBU-31 JDAM 2,000-lb
(BLU-109 Warhead)

AIM-120C AMRAAM

AIM-132 ASRAAM

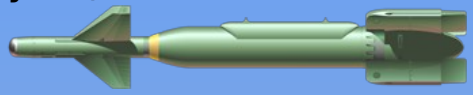
Weapons Currently Under Development

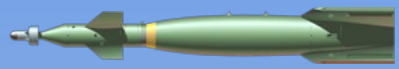
UK 500# PGB


Phase I SDB

EXTERNAL WEAPONS

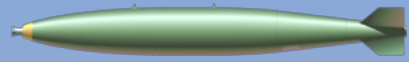
GBU-10 Paveway II 2,000-lb LGB (MK-84 Warhead)

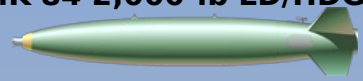

GBU-24/B Paveway III 2,000-lb LGB (MK-84 / BLU-109 War


GBU-16 Paveway II 1,000-lb LGB (MK-83 Warhead

MK-83 BLU-110 LDGP 1,000-lb LDGP

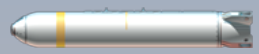
MK-83 BSU-85 HDGP


MK-84 2,000-lb LD/HDGP


MK-84 BSU-50 Ballute 2,000-lb HDGP

GBU-12 Paveway II 500-lb LGB
(MK-82 Warhead)

MK-82 500-lb LD & HD


CBU-99/100 Rockeye II
Cluster Munition

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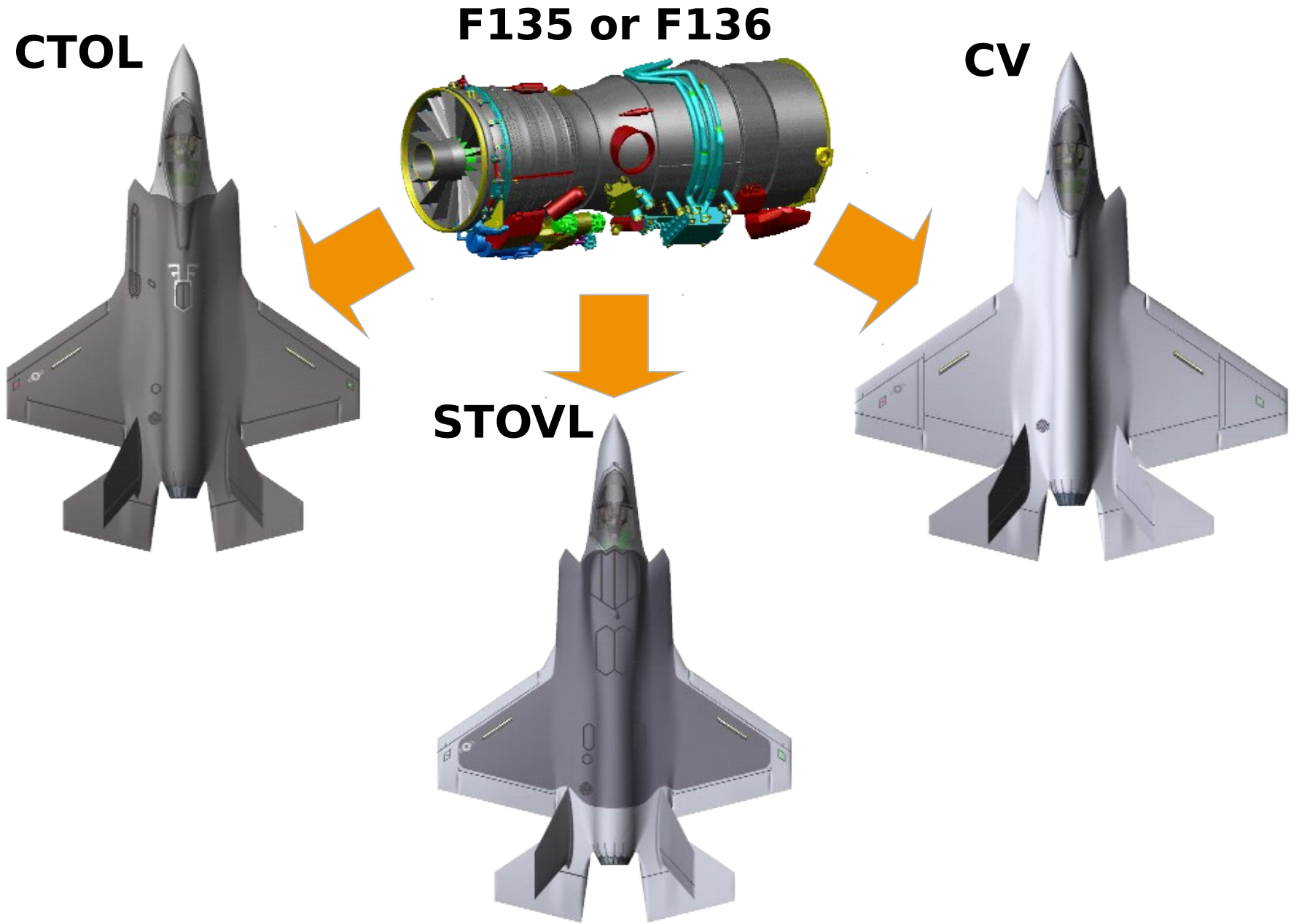
Engine Interchangeability… Either Engine in any of the Three Aircraft Variants



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JSF Joint/International Strategy

Joint

- Common Vision
- Alternating SAE/PEO
- Shared Governance
- Common Requirements
- Common/Cousin Hardware
- Split USAF/USN SDD Funding
- Service Production Funding
- Mix JPO Staffing
- “Best Athlete” Leadership
- Lead Service Processes
- Joint Testing
- Joint Training

International

- Shared/Common Vision Requirements
- Country Funding by Level
- Joint Leadership Meetings
- Information Sharing
- International Forums (EC)
- Coalition Interoperability
- JPO Staffing by Level
- Industrial Participation
- Country-Unique Studies

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JSF International Strategy / Cooperative Framework

Enablers

MOU & LOA

Gov't to Gov't

Industry to Industry

Agreements & Licenses

Multinational Cooperative Development Program

Enhances Future Interoperability & Coalition Warfare

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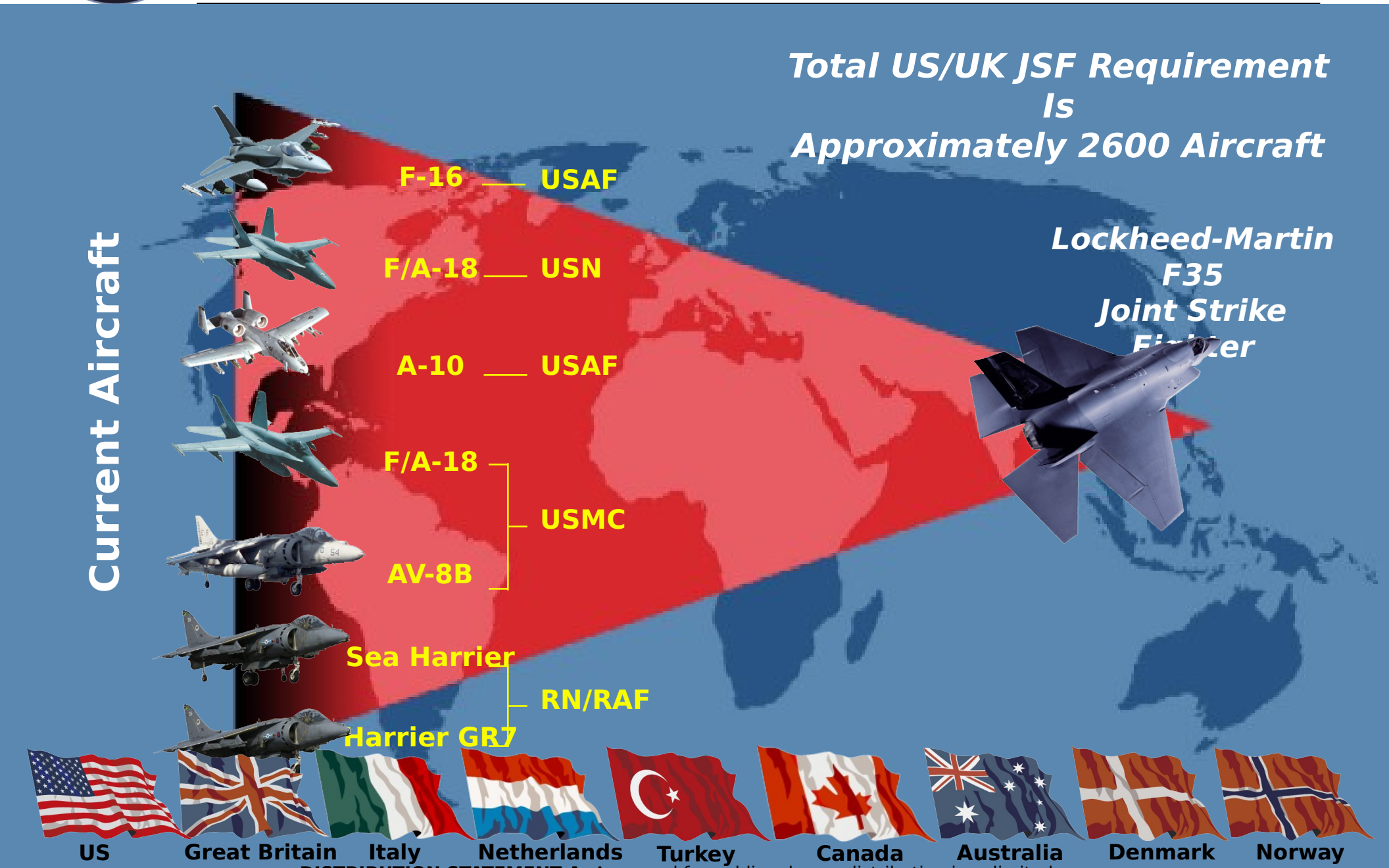
JSF Enables True Joint, Coalition Operations



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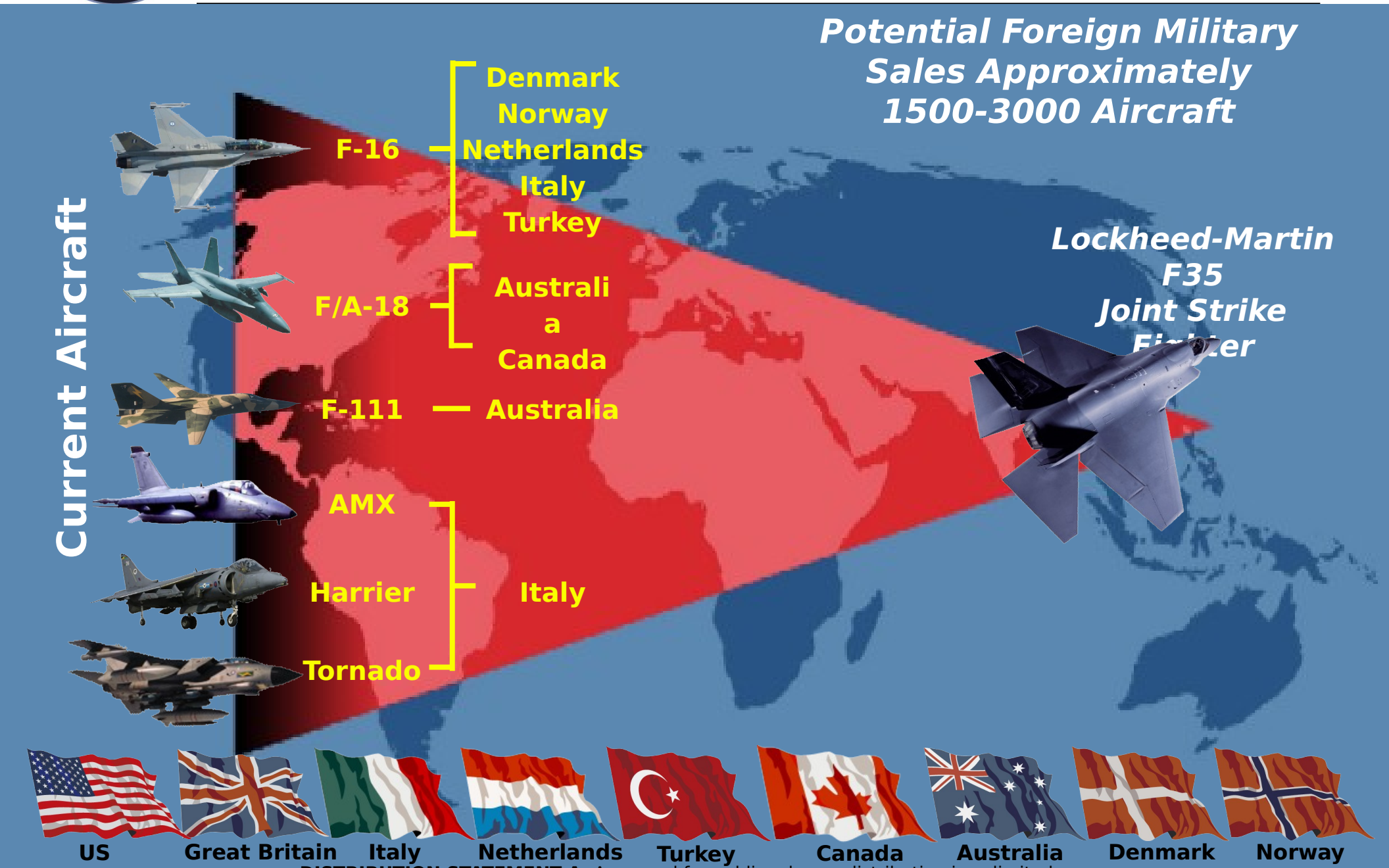
JSF Enables True Joint, Coalition Operations



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JSF International Program Progression

CDP (1997-2001)

- **4 Levels**
  - Collaborative
  - Associate
  - Informed
  - FMS Customer
- **Open Invitation**
- **Min. Investment**
- **Disclosure Constraints**

Lessons Learned

SDD (2001-2012)

- **Options**
  - **Coop. Partner**
    - 3 Levels of Investment
    - By invitation only
    - Improved Data Access
  - **SCP**
    - Limited to IS & SN
    - LOI & LOA
    - Disclosure Constraints
  - **FMS Customer**
    - Case-by-Case
    - Standard LOA
    - Disclosure Constraints

Production (2008-2030)

- **3 Options**
  - MOA for Cooperative Production
  - FMS (LOA)
  - Commercial

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JSF System Development & Demonstration Phase International Program

LEVEL 1 PARTNER

UNITED KINGDOM **$2,056M**

LEVEL 2 PARTNERS

ITALY **$1,028M**

NETHERLANDS **$800M**

LEVEL 3 PARTNERS

TURKEY **$175M**

CANADA **$150M**

AUSTRALIA **$150M**

DENMARK **$125M**

NORWAY **$125M**

SECURITY COOPERATION PARTNER

ISRAEL

SINGAPORE

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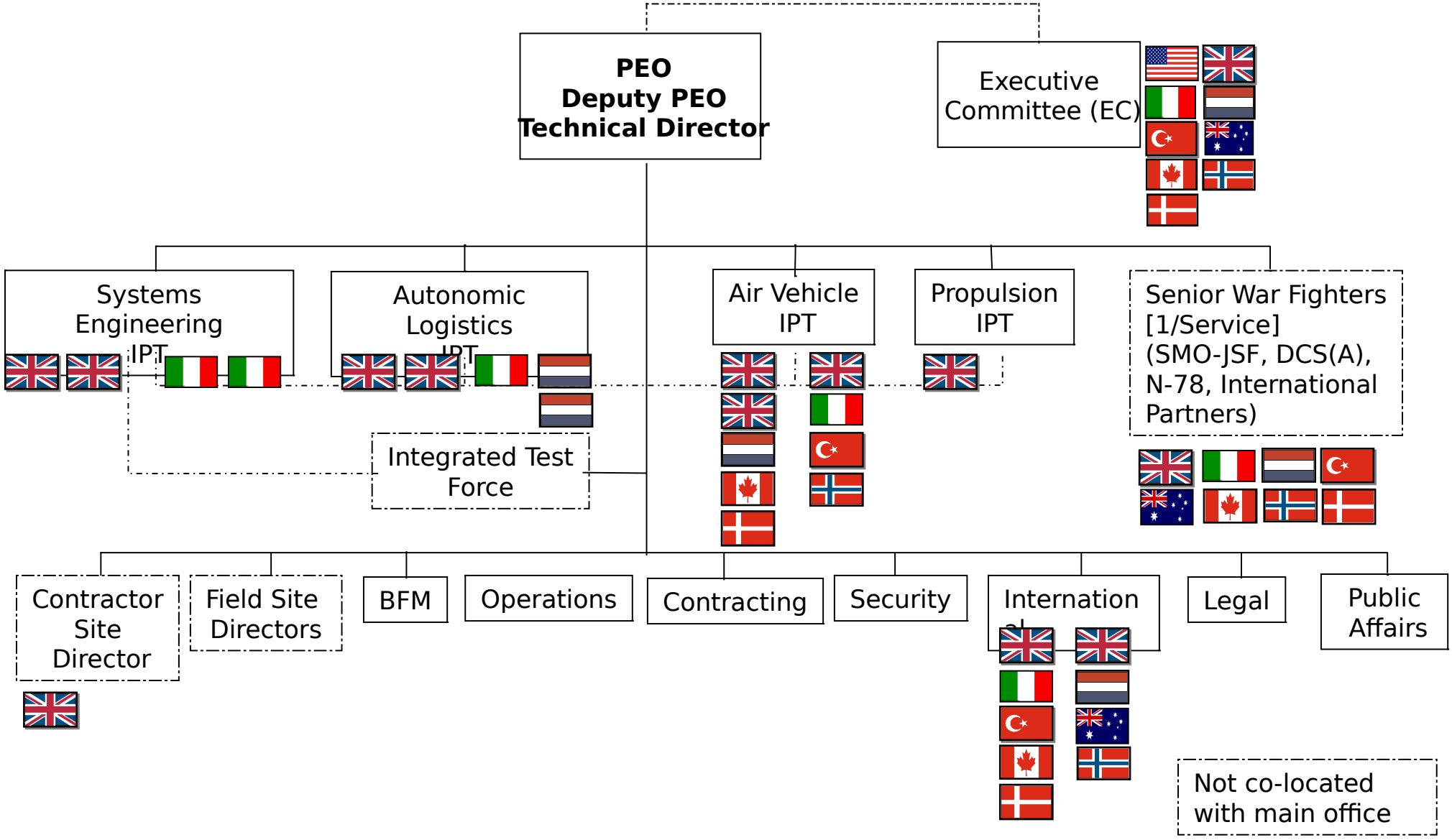
International Participation in JSF Management Structure



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Cooperative Production and Sustainment MOU

- **The Cooperative Production and Sustainment MOU will be a multilateral agreement that continues and expands the cooperative relationship established during SDD in order to proceed with the production and sustainment phases of the program**
- **It will not change the SDD MOU**
- **It will only be open to SDD Partners**
- **The MOU will address:**
  - Follow-on development to address common and Partner-unique requirements
  - JSF Air Vehicle, Propulsion System and AutoLog Production
  - JSF Sustainment
  - Industrial Participation, Recoupment, Data Rights, Management, etc.
- **Security Cooperative Participants - Handled separately**

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International Industry Participation

- **Objectives**
  - Support International Best Value Use of Partner Industries
  - Protect Appropriate US Technology and Capabilities
- **Challenges**
  - Exporting a Stealth Aircraft
  - Protect our sensitive technology
  - US does not have all the answers
  - Need for level playing field for Industrial Participation
  - Normal Export License Process
- **Tools to Meet the Challenges**
  - ITAR-Related
    - Global Project Authorization (GPA)
    - B&P Exemption
  - Partner Industry Outreach Program
  - DoD/US Industry Stakeholders Meetings
  - Lockheed Martin Technology Roadmap

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JSF International Industry Participation

F136 International Participation

F136 — A STEP BEYOND

UK
Rolls-Royce
Cross
Doncasters

Netherlands
Philips
Eldim
Sulzer Metco
Senior Aerospace Bosm
Stork
Fokker Elmo
Axxiflex
Nedtech

Denmark
Danish Auto Logistics Team
Terma
GPV

Purchase Order
RFP / RFQ
Opportunities

6 Partner Cou

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DISTRIBUTION STATE

F135 International Program Status

Orders placed in excess of $1.2B with 35 suppliers

PRATT & WHITNEY — JSF PROPULSION SYSTEM — F135 — ROLLS-ROYCE HAMILTON SUNDSTRAND

Purchase Order
RFP / RFQ

U.K.
Callender
CW Fletcher
Doncaster
Dunlop
GKN
OMG
Rolls-Royce
Serck
Smiths
Cross Manf.
McBraida
Weston EU
Allen Gears
Mettis
Silcoms
Aeromet
Thermal Engr.
Firth Rixon
Bowmill
Arden
Kiggas
HS Claverham
HS Marston

Turkey
ALP Aviation
Tecnoplazma
Kaleklip
TAI

Norway
Volvo Aero
R-R Norway

Netherlands
Eldim
Fokker Elmo
NCLR
Fokker Special Products
DAP
Hankamp Gears
Axxiflex
Senior Bosman
PHM Group/TNO
Urenco

Australia
WASA
Production P
Ferra
Hawker de H
GKN
DSTO

Committed to Expanding Opportu

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F-35 International Program Status

Awards/ Commitments
RFI / RFP Pending
Opportunities

U.K.
BAE SYSTEMS
Goodrich Adv. Sys
Helmet
Integrated Sys.
Martin Baker
Hambles Sturc.
Smiths +Others
Beaufort
Smiths
GKN
Microfiltrex
HS Claverham
HS Marston
QinetiQ
Didsbury Engr
Kennard
+Others

Turkey
TAI
Ayesas
Havelsan
KaleKalip
TAI
Aselsan
MIKES
Hema
KaleKalip
ALP
Parsans
Gate
Elektronic
ALP Aviation
Aselsan
AYESAS
Gate
Elektronic
Havelsan
Hema/Alp
Kale Kalip
Marconi
Mikes
Parsan Steel
Forging
TAI
TEI
+Others

Netherlands
ATS Kleizen
Fokker Elmo, Aero, Defense
Sun Electronic
Philips Aerospace
SP Aerospace
Thales Cyrogenics
DAP
Thales Optronics
Sun Electronic
Phillips Aerospace
Thales Cyrogenics +Others
Axxiflex
Senior Aerospace Bosman
PHM Group
Urenco
+Others

Norway
Kongsberg
Metronor
Techni
NERA
Kongsberg
Kitron
3D Perception
Applica
Ericsson
Kitron
Metronor
Nammo
Natech
NERA
Presens
SensoNor AS
SINTEF
T & G Elektro
Thales Comm.
+Others

Australia
Micro LTD
Ferra Engineering
Hovitt
Cablex
Varley
Production Parts
Calytrix Technologies
+ Others
Micreo
Cablex
Lovitt +Others
Compucat
Rosebank Eng
+Others

Denmark
Terma AS
GPV
SSE
IFAD
HiQ Wise
Corena
Terma
SSE
GPV
E.Falk Schmidt
Maersk Data Def
Elbo Production
Danish Aerotech
Hamann Electronics
+Others

Italy
Alenia
Marconi Sirio Panel
Galileo
Piaggio
Moog- Caselle
UOP
Secondo Mona
Samputensilli
Marconi Selenia
York
+Others
OMA
Mecaer
Aerea
Aermacchi
Galileo
ASE
Forgital
Inossman
Logic
+Others

Canada
Herovx-Devtek
Magellan-Chicopee
Honeywell Eng. Sys
DY4
Mindready
Howmet
Virtek +Others
Mustang Surv. Co
Bristol Aerospace
Graphico
Novatronics
DMG +Othes
Bombardier
Air Data Inc
CMC Electronics
Noranco +Others

Committed to Expanding Opportunities in all Partner Countries

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31

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Future … with F-35

- **F-35 Creates Truly Global, Highly Effective Fighter Force**
- **Coalition Package Able to Tackle Heavily Defended Targets**
- **Closes Aerospace "Capability Gap"**

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WORKING TO AFFORDABLY MEET THE REQUIREMENTS OF THE WARFIGHTER

JOINT STRIKE FIGHTER
the next generation strike fighter

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JOINT STRIKE FIGHTER
the next generation strike fighter

BACK-UPS

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Global Project Authorization

- **Umbrella Authorization to allow release of certain technologies**
  - Released by the State Department Office of Defense Trade Controls on 25 October 2002
  - Amended numerous times in order to increase number of authorized US and Partner industries
  - Eligible parties now include
    - 43 U.S. Suppliers
    - 441 JSF Partner Suppliers
  - Updates sent quarterly by LM to State Dept
  - Three US Suppliers currently using GPA (LM, NG, and L-3)
  - Implementing Agreement (IA) Status
    - For 2004 – 33 IA's Approved - Average DDTC turn around time is less than four days (includes weekends)
  - Bottom Line
    - GPA reduces approval period from 56 days to less than four days
    - Participation in the GPA allows use of the ITAR Exemption for Bid and Proposal

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ITAR Exemption for Bid and Proposal

- **Replaces the DSP-5 (the traditional export license used to export a Request for Information)**
- **U.S. Supplier (GPA Annex I) can send the RFI directly to foreign industry once approved by the JSF Program Office**
- **This ITAR Exemption reduces approval time from 56 days to 2 days**
  - Provides the requisite time for the U.S. supplier to provide foreign suppliers RFIs/RFPs without impacting schedule
  - Over 150 RFIs/RFPs have been approved since April 2003 using this exemption
  - Technical data exports are limited to foreign suppliers in any NATO country and Australia
  - Technical data limited to unclassified information

Promoting a level playing field for our partners

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Outreach Program

- **Outreach Session: Visit each Partner Country**
  - Partner Industries have opportunity to meet the team working JSF licensing for DoD and the Department of State
  - Offers Partner industries the chance to ask questions in regards to the US export license system
  - Educates US export license reviewers on Partner industry capabilities

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Stakeholders' Meetings

- **Advance vetting of critical licenses before formal submission to Department of State**
- **Stakeholders include JPO, LM, DTSA, Air Force, and Navy plus required special authorities**
- **We try to have agreement on scope and any limitations (provisos) before license agreement is submitted to Department of State**
- **Reduces "surprises" during review process and reduces Returned Without Actions (RWA) from Department of State**

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Technology Roadmap

- **Lockheed Martin Produced**
  - Provides a plan for Future Export License requirements from a Technology release standpoint
- **Allows USG National Disclosure Policy (NDP) Community to plan with Lockheed Martin for desired release of appropriate technology**
  - Avoids schedule delays and cost impacts
  - DTSA committed to working with JSF stakeholders to work issues in advance, help maintain program schedule, and allow JSF program office and contractors to find alternative solutions in cases where technology is not releasable

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WORKING TO AFFORDABLY MEET THE REQUIREMENTS OF THE WARFIGHTER

JOINT STRIKE FIGHTER
the next generation strike fighter

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